ECOLOGICAL SURVEY REPORT

SAN EMIGDIO MESA CANDIDATE RESEARCH NATURAL AREA

LOS PADRES NATIONAL FOREST, MT. PINOS RANGER DISTRICT
VENTURA COUNTY, CALIFORNIA

prepared by

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1.0 INTRODUCTION

Research Natural Areas (RNAs) are ecological or natural resource areas established on National Forest System lands as part of a continuing land and resource management planning process, and are set aside in perpetuity for research and education and/or to maintain biodiversity. In addition to being used for non-manipulative research, observation, and study, RNAs may implement provisions of laws such as the Endangered Species Act and the monitoring provisions of the National Forest Management Act.

Other general objectives of establishing RNAs, in addition to the broader ones identified above, include preserving, protecting, and maintaining special or unique natural habitats, ecotypes, and genetic diversity, protecting the areas against environmental or human disturbances, setting aside long-term controls or study sites for observing succession of communities and ecological change, and providing areas to monitor effects of natural resource management techniques and practices. Detailed descriptions of RNAs and policies governing them are provided in Section 4063 of the Forest Service Manual.

The San Emigdio Mesa Candidate Research Natural Area (CRNA) is located in the Mt. Pinos Ranger District of the Los Padres National Forest, California. The area was selected to represent an example of the pinyon-juniper woodland target vegetation type within the Transverse Ranges physiographic province in the Region 5 (Pacific Southwest Region) national RNA Program. On June 19, 1992, this region was included in the Chumash Wilderness established in the Los Padres National Forest (PL 102-301; Figure 1).

2.0 PHYSICAL DESCRIPTION OF THE CRNA

2.1 Physical Setting, Hydrology, and Climate

San Emigdio Mesa lies in the mountains of central and northern Ventura County, part of the Transverse Ranges of southern California. The mesa is bordered by the Mt. Pinos region to the east; to the west of it lies Cuyama Valley. San Emigdio Mesa drains into the ocean by way of Apache Canyon, then the Cuyama

River, and ultimately the Santa Maria River (Figure 1). This region is included in the South Coast Drainage Basin of California (U.S. Department of Commerce, 1964).

Average precipitation in the pinyon-juniper woodland region ranges from 12-20 inches (30-51 cm), with some snow at higher elevations and some summer showers. The growing season lasts from 5-8 months, with 150-250 frost-free days. The mean summer maximum temperatures range from 88-95°F (31-35°C), and the mean winter minimum temperatures from 20-30°F (-7--1°C; Munz and Keck, 1968). Average annual temperature ranges from 50-60°F (10-15°C) over the northern two-thirds of Ventura County, with a large annual range in temperature (Soil Conservation Service, 1970). The average dates of the first and last freeze in the year range from October to December and May, respectively. Snowfall in the northern half of Ventura County averages 5 inches (13 cm) or more a year; along the northern border near Mt. Pinos, it averages more than 20 inches (51 cm).

Potential evapotranspiration is about 28 inches (71 cm) for the entire year in interior Ventura County, and about 20 inches (51 cm) for the growing season; the figures estimated for actual evapotranspiration are 7 inches (18 cm) and 3-5 inches (8-13 cm), respectively. Range grasses are estimated to dry out as early as the end of May in the northwestern corner of the county (San Emigdio Mesa region), and as late as early June in the mountains (Soil Conservation Service, 1970).

Some data were available from the Climatic Summary of the United States (U.S. Department of Commerce, 1964) for climatic stations in the region. Weather data were available from Cuyama and two stations in Ozena, but are not provided in this report because these stations are relatively far from the CRNA, and are situated in valleys at much lower elevations, below 3750 feet (1143 m). Regarding stations where the only equipment is a recording type rain gage, two stations near the CRNA had data available for total precipitation: Apache Camp (latitude 34°52'N, longitude 119°20'W, elevation 4965 ft or 1513 m), and Chuchupate Ranger Station (latitude 34°48'N, longitude 119°01'W, elevation 5260 ft or 1603 m). Apache Camp Station is located north of Quatal Canyon in a mountainous area similar to the San Emigdio Mesa area, and Chuchupate Ranger Station is located at the base of the Mt. Pinos region mountains in Lockwood

Valley (Figure 1). Both stations were established prior to 1951. Mean annual total precipitation for the years 1951-1960 recorded at Apache Camp was 8.67 inches (22.02 cm) and at Chuchupate Ranger Station was 11.07 inches (28.12 cm). The minimum rainfall was recorded in July and August for the two stations, respectively, and the maximum in January.

2.2 Location and Access

The San Emigdio Mesa CRNA is located approximately at 34°48' N latitude and 119°15' W longitude, in the northwestern corner of Ventura County, very near its border with Kern County. It occurs in parts of Sections 7, 8, 12, 13 and 18, in T 8 N and R 22 W; the area is mapped on the Apache Canyon and Sawmill Mountain 7.5 minute Quadrangles (Figures 1 and 2). The CRNA encompasses 1200 acres (486 ha).

San Emigdio Mesa is accessible from the west via Apache Canyon Road off State Highway 33. Apache Canyon Road (Forest Road 8N06) is classified as an unimproved dirt road and is passable most of the year. A 4WD vehicle is not generally necessary. The road bisects the canyon in a number of places, and the wide shallow dry wash can flood during high winter rains, resulting in numerous washouts in the road, which make it impassable temporarily. The road is graded and repaired in late spring/early summer. From Santa Barbara, driving time to the western boundary of the CRNA is about 2.5 hours, and the distance covered approximately 83 miles (133 km). From the Supervisor's Office of the Los Padres National Forest in Goleta, driving time would be 2.75 hours and the total distance about 92 miles (147 km).

To reach San Emigdio Mesa CRNA, drive south on U.S. Highway 101 from the Supervisor's Office about 22 miles (35 km) to the junction of State Highway 150, and follow that about 15 miles (24 km) to the junction of State Highway 33. Follow Highway 33 for about 45 miles (72 km) beyond the Lockwood Valley Road junction to the Apache Canyon Road turnoff to the right (Figure 1). Follow this road about 8.5 miles (14 km) to the turnoff for Nettle Spring Campground. Various private landowners, mainly ranchers, own parcels of land along Apache Canyon Road, and have agreements with the Forest Service allowing public access to Nettle Spring Campground. Two unlocked gates are located along this access route. Since San

Emigdio Mesa CRNA is part of the Chumash Wilderness, the last 1 mile (1.6 km) to the western edge of the CRNA must be traversed by foot. Most of this last section is part of a privately owned land parcel, and is preceded by a locked gate. Apache Canyon Road forks at the western edge of the CRNA (the point marked X in Figure 2); two dirt roads, Forest Road 8N06A and Forest Trail 22W24, proceed south and north, respectively. After continuing about 0.75 miles (1.2 km), the southern fork was washed out by water in Apache Canyon at the time of the field visits. The northern fork terminates temporarily after about 0.5 miles (0.8 km) at Cienega Spring, a wetland meadow, and then continues, unmaintained, along the northern boundary of the CRNA for about 1 mile (1.6 km). No trail exists within the relatively undisturbed CRNA.

2.3 Topography

The boundaries established for the CRNA generally follow topographic divides (Figure 2). Elevations within the CRNA range from 4500 feet (1372 m) in the western part below the mesa to 5750 feet (1753 m) in the eastern part on top of the mesa. The area is part of a large, gently sloping to flat, alluvial fan formed at the base of Cerro Noroeste (Mt. Abel) and neighboring slopes. Most of the CRNA in the eastern part is composed of this alluvial fan, dissected by many intermittent streams and gullies. The western part of the CRNA leading to the base of the mesa and to the wide, shallow Apache Canyon, is made up of steeper slopes, spurs and ridges. Following an extended drought period in southern California, the channels, gullies and washes were all dry at the time of surveys in Spring and Summer 1992. The gullies bordering the northern and southern boundaries of the CRNA are particularly deep, with steep walls, but most gullies slope gently or are shallow, and provide easy access to the top of the mesa (Figure 2).

2.4 Geology and Soils

Geologically, this region is bounded by the San Andreas Fault to the north, the Big Pine Fault to the south, and the Ozena Fault to the west (Norris and Webb, 1976). The Mt. Pinos region is composed of granitic intrusive igneous and metamorphic rocks mainly of the Mesozoic Era (Jurassic Period) or older. The San Emigdio Mesa region is composed mainly of Cenozoic Era nonmarine (terrestrial/continental) sedimentary

rocks and alluvial deposits (Figure 3). The top of the mesa is made up of Quaternary Period (Pleistocene Epoch) older surficial sediments: coarse fan gravel (cobble-boulder gravel) of granite and metamorphic rocks derived from the Mt. Pinos region, embedded in a sandstone matrix (Qog). These surficial sediments are probably underlain by red clay in the western part of the mesa. The western boundary of the CRNA is composed of folded rock from the lower part of the Morales Formation (terrestrial/nonmarine, late Pliocene Epoch), made up of alluvial gravel, sand, and some clay (Tmol). A small southern section of the CRNA is composed of light red beds of clays, sandstone, and conglomerates of the Quatal Formation (Tq; terrestrial/nonmarine, Hemphillian Stage, Pliocene Epoch). Geological units were field mapped by Tom Dibblee (Dibblee, 1971; 1993) and are depicted in Figure 3.

Soils in the region were mapped in a third-order survey by the U.S. Forest Service (O'Hare and Hallock, 1987). Soils of the San Emigdio Mesa CRNA belong mainly to the Morical-Supan-Green Bluff Families Association, and also the Los Robles-Trigo Families-Orthents Association and the Orthents-Fluvents Complex (map units 35, 24, and 39, respectively; Figure 3). These units with associated soil characteristics are described in Appendix A. In general, the soils are composed of a range of textures, from rocky and very coarse gravel at the top of the mesa to extremely fine-grained soil on fluvial terraces adjacent to Apache Canyon (Table 1).

2.5 Natural and Human Impacts and Land Use

No major fires in the region have been recorded since 1912. Small local fires may have occurred from lightning strikes, but no evidence of these were seen during the field visits. In general, the lack of fine fuel beneath trees in open pinyon-juniper stands makes the probability of killing trees taller than 4 feet (1.2 m) low. In closed stands with a sparse understory, fires do not carry easily (Rich and Borchert, 1982).

Since the land in the CRNA is federally owned, no private mining occurs in the area, nor have mining claims been reported; all mineral rights, similarly, are owned by the U.S.A. (Vredenburgh, 1993). The mineral resource potential of roadless areas in the Los Padres National Forest was assessed by the U.S.

Geological Survey and the U.S. Bureau of Mines in the 1980s, and summarized in a report by Frizzell, Smith, Kuizon, and Hale (1985). The Quatal Roadless Area No. 5268, 11 square miles in size, lies near the San Emigdio Mesa CRNA, and contains subeconomic reserves of bentonitic clay; in general, however, the authors indicate a low potential for the presence of undiscovered mineral resources in the Quatal Roadless Area. Although the U.S. Forest Service indicated that the general area is known to contain palladium in low concentrations, this was judged to be unlikely by a BLM geologist (Vredenburgh, 1993). Oil and gas potential in the area was reported to be moderate by the U.S. Forest Service; in the CRNA, there are no known active or pending oil and gas leases, or leases for any other substances such as phosphates (Vredenburgh, 1993). Oil and Gas Lease Application No. CA 1983, which included Sections 12 and 13 on the topographical maps, was withdrawn on January 21, 1992, and was not renewed.

No commercially important timber species occur on the CRNA; in any case, since the area belongs to the Chumash Wilderness, logging or timber activity is prohibited. The entire CRNA lies within the Apache Canyon Grazing Allotment, which is grazed currently between June 1 and October 31. Grazing is the only major disturbance in the western section of the CRNA, but is absent atop the mesa. Grazing activity, apparent from the frequency of cow pies observed, is intense in the Cienega Spring meadow area, and at the base of the shallow washes nearby. Cow pies were observed in the washes up to about 4950 feet (1509 m), and are absent above that elevation, where most gullies narrow considerably.

Nettle Spring Campground is the only campground in the vicinity open to the public. Only light recreational activities resulting from camping and some hunting and target practice proceed immediately outside the CRNA in Apache Canyon; most disruptive recreational activities, such as the use of OHVs, were not evident at the time of the field visits. Since San Emigdio Mesa CRNA is part of a Wilderness area, recreation is restricted severely, and is limited to off-trail hiking or bird watching.

The CRNA has a high cultural resource value potential, for example, for open-air campsites and historic rock art sites, particularly on slopes below San Emigdio Mesa, and at lower elevations adjacent to and in Apache Canyon and nearby washes. Rock art sites exist in the vicinity, situated close to the center of the

Chumash universe and the sacred mountain, Mt. Pinos. No cultural resource survey has been completed for the area but should be conducted, particularly because of adverse impacts from grazing, OHV vehicle use, and mining reported in nearby areas (McFarland, 1993).

3.0 ECOLOGICAL DESCRIPTION OF THE CRNA

3.1 Locations Surveyed

An initial visit was conducted on May 9, 1992, for a floristic and reconnaissance survey. Locations surveyed at this time were below the upper mesa slopes on the south and west sides of the CRNA boundaries. During a second trip on May 25, 1992, more locations were surveyed at upper elevations in the northern part of the CRNA (Figure 2). Plant voucher specimens were collected during these two trips at all locations A through K (Figure 2) and site descriptions prepared for these locations (Table 1). A final visit was made on October 18, 1992, to collect quantitative vegetation data. Areas surveyed on this trip include all previous locations; sampling points were located in representative areas at the base of the mesa on slopes and in washes, and on top of the mesa on flatter areas and higher elevations.

3.2 Plant Communities

The San Emigdio Mesa CRNA contains a homogenous distribution of open stands of low trees with shrubs between, almost exclusively dominated by the main plant community, pinyon-oak-juniper woodland (Figure 4). The dominant tree species is one-needle pinyon pine (*Pinus monophylla*), evenly distributed all over the area from low to high densities. Heights of trees of this species are variable, ranging from about 6-65 feet (1.8-20 m) in the areas sampled, and more typically in this vegetation type from 10-30 feet (3-9 m; Munz and Keck, 1968). Major shrub species are dwarf or scrub oak (*Quercus turbinella* ssp. *californica*) and California juniper (*Juniperus californica*). In most locations, particularly at higher elevations and in narrower, cooler, and shadier washes or on more northern exposures, dwarf oak is the dominant shrub species, so that the pinyon-juniper woodland target type for the CRNA is associated with a third co-dominant

species, dwarf oak (Table 1). Junipers occur more at lower elevations (they are very sparse above 4500 ft or 1372 m), in wider, shallower, and more open washes, and on western and southern exposures. The pinyon-oak-juniper woodland appears to be even-aged except at the top of the mesa, where two patches of a young and a mature phase are seen (Figure 4). At all locations, vegetation was observed to be healthy.

At lower elevations at the base of San Emigdio Mesa on flat alluvial washes and terraces, other major understory shrub species are found in the pinyon-oak-juniper woodland: Great Basin sagebrush (*Artemisia tridentata*), rabbitbrush (*Chrysothamnus nauseosus* ssp. *hololeucus*), and stenotopsis (*Haplopappus linearifolius*). The understory in most places also is dominated by perennials such as lupine (*Lupinus excubitus* var. *austromontanus* or *L. formosus*), buckwheats (*Eriogonum fasciculatum* ssp. *polifolium, E. wrightii* ssp. *subscaposum*), scarlet bugler (*Penstemon centranthifolius*), and many annual species (Tables 1 and 2). At higher elevations at the top of the mesa, in low densities of pinyon-oak-juniper woodland with a sparse understory, low cushion plants such as buckwheat (*Eriogonum kennedyi*) and locoweed (*Astragalus purshii* var. *tinctus*) are found in gravelly or rocky soil on gently sloping, open flats (Table 1).

Along with pinyon-oak-juniper woodland, alluvial wash and terrace vegetation, and upper mesa flats vegetation, a small area at Cienega Spring in the northwestern part of the CRNA is occupied by wetland meadow vegetation (Table 1; Figures 2 and 4). This is composed of species generally occurring in "drier" wetland habitats and those wetland species found in flooded spring or seep habitats. The dry meadow wetland community is dominated by rushes (*Juncus* spp.) and sedges (*Carex* spp.), with wetter areas occupied additionally by bulrushes (*Scirpus* spp.), spikerushes (*Eleocharis* spp.), monkey-flower (*Mimulus guttatus*), speedwell (*Veronica americana*), and buttercup (*Ranunculus cymbalaria*).

Pinyon-juniper woodland in the San Emigdio Mesa region intergrades with the type found in the higher Mojave Desert mountains on dry, rocky montane slopes, at elevations ranging from 5000-8000 feet (1524-2438 m), and occurring between the yellow pine forest and Joshua tree woodland or sagebrush scrub (Munz and Keck, 1968; Thorne, 1976). With respect to the terrestrial natural communities described by Holland (1986), the pinyon-juniper woodland found here does not belong to a single Holland type; it contains

elements mainly of Mojavean Pinyon Woodland (72210), better developed on steeper slopes, but also intergrades with the lower-elevation Mojavean Juniper Woodland and Scrub (72220). These types are described in Appendix B.

Species nomenclature follows Abrams and Ferris (1940), Twisselmann (1967), Munz and Keck (1968), Munz (1974), and Smith (1976). Photographs taken at San Emigdio Mesa of the locations surveyed with different plant communities and species are reproduced in Appendix C.

3.3 Flora

A species list of the plants observed at San Emigdio Mesa CRNA is given in Table 2. Voucher specimens were collected for most species in Spring 1992 and are deposited at the Herbarium at the Santa Barbara Botanic Garden. Although overstory species are limited, annual species are abundant, especially in the spring. Perennial species and shrubs, although fewer, occupy a relatively high cover in the understory, especially at lower elevations in the CRNA. The flora is species-rich, derived historically mainly from the Conifer Woodland Element of the Madro-Tertiary Geoflora (Munz and Keck, 1968; Munz, 1974). The species composition is particularly interesting, being composed of many desert transitional species co-occurring with cismontane, more coastal California taxa, and interior varieties. Some of the species observed occur many miles outside their previously reported ranges, for example, Lemmon's xerasid or syntrichopappus (*Syntrichopappus lemmonii*), normally an interior species, which at San Emigdio Mesa is about 75 miles outside its documented range (Smith, 1976; 1992).

3.4 Sensitive Species and Habitats

No federally- or state-listed threatened, rare, endangered, or candidate plant or animal species are known to occur or were sighted in the San Emigdio Mesa CRNA. However, the region is part of the endangered California condor (*Gymnogyps californianus*) breeding habitat. A CNPS List 4 sensitive plant species, Lemmon's xerasid or syntrichopappus (*Syntrichopappus lemmonii*), was seen in the CRNA (Tables 1 and 2;

Figure 2), but is not federally- or state-listed. California jewelflower (*Caulanthus californicus*) has been reported from nearby canyons (Magney, 1988), but was not sighted in the CRNA. This species is on CNPS List 1B, is state-listed as CE (Endangered), and federally-listed as C2 (Candidate 2; Smith and Berg, 1988).

The wetland meadow at Cienega Spring is a Cooperative Wildlife Project for study and protection of the wetland area, set up by the U.S. Forest Service, the California Department of Fish and Game, and the Apache Canyon Allotment Permittee. This area is a unique wetland meadow habitat with springs, but has been heavily trampled by grazing cows and should be protected in the future.

3.5 Quantitative Vegetation Assessment

The point-centered quarter method (Barbour, Burk and Pitts, 1980), a distance/plotless method for sampling vegetation, was used to evaluate density of the tree species one-needle pinyon pine (*Pinus monophylla*) and the shrub species California juniper (*Juniperus californica*), the two main components of the CRNA target vegetation type, pinyon-juniper woodland. Thirty random sampling points were located in the different pinyon-oak-juniper woodland density and age types mapped in the San Emigdio Mesa CRNA (Figure 4). The area around each point was divided into four quadrants. The nearest pinyon or juniper in each quadrant was identified, its distance from the central point was measured in meters, and its height was estimated. Diameter at breast height (dbh) was measured in centimeters for one-needle pinyon pine (*Pinus monophylla*). Average basal area was calculated in square meters from the dbh data. Basal area was not calculated for California juniper (*Juniperus californica*) because of its shrubby nature and the extensive branching of its main trunk.

Average distance for all trees taken together was computed. The following formulae were used to calculate the total density of trees per hectare (10000 m^2), ~~relative~~ density of species X, and basal cover or dominance of species X:

$$total\ density = \frac{10000}{(average\ distance)^2}$$

$$relative\ density\ of\ species\ X = \frac{no.\ of\ trees\ of\ species\ X}{total\ no.\ of\ trees} \times total\ density\ for\ all\ trees$$

$$basal\ cover/dominance\ of\ species\ X = relative\ density\ of\ species\ X \times average\ basal\ area\ of\ species\ X$$

Around each sampling point, the number of seedlings and older saplings or shrubs were tallied within an area of 50 m^2 for one-needle pinyon pine (*Pinus monophylla*), California juniper (*Juniperus californica*), and dwarf oak (*Quercus turbinella*).

Results from the vegetation sampling data are provided in Table 3. Dbh values varied from about 3-76 cm for pinyon pines, the average being about 18 cm; mean basal area was 0.04 m^2. Estimated tree heights ranged between 1.8 m and 20 m. Relative density of adult pinyon pines was about 225 trees/ha, with the basal cover or dominance of this species being 9.27 m^2/ha. Seedling and sapling recruitment numbers were moderate—a total of 46 seedlings and 32 saplings were counted, each group present in 14 of the 50 plots sampled (46.67 percent).

Heights of junipers in the plots varied from 1.8-5 m. Relative density of adult junipers was about 42 trees/ha, considerably lower than that for pinyon pines. Recruitment of junipers, similarly, was poor: a total of only 3 saplings were counted in 1 of 50 plots (frequency 3.33 percent), and no seedlings were observed at all. In contrast, the highest recruitment numbers were observed for oaks: 103 seedlings (frequency 70 percent) and 95 saplings or mature shrubs (frequency 86.67 percent). These data confirm field observations about the dominance of dwarf oak (*Quercus turbinella*) over California juniper (*Juniperus californica*) in the pinyon-oak-juniper woodland in the San Emigdio Mesa CRNA.

4.0 RECOMMENDATIONS

4.1 Management and Human Impacts

The San Emigdio Mesa CRNA is a relatively undisturbed area, and should remain so, since it is part of the Chumash Wilderness. However, grazing in the CRNA should be discontinued altogether or severely restricted, so that the unique annual flora and plant communities in the area may be preserved. This is particularly relevant in the wetland area of Cienega Spring. Such wetlands occurring in desert transitional and lower montane habitats are rare, and are occupied by a unique assemblage of species; they offer valuable research opportunities. Recreational activities which are not permitted in Wilderness Areas, for example, target practice, hunting, and mountain biking, should be prohibited by the U.S. Forest Service through regular monitoring or patrolling, or with the aid of signs.

4.2 Boundary Considerations

The proposed boundaries of the CRNA are felt to be adequate in representing and preserving the pinyon-juniper woodland vegetation type, although it must be mentioned that dwarf oak is a co-dominant species in this type. No changes in boundaries are suggested, except to include Cienega Spring and the wetland meadow around it (about 5-10 ac) at the northwestern edge of the CRNA (Figures 2 and 4).

4.3 Summary

San Emigdio Mesa represents a woodland type and a geomorphic landform previously absent from the national RNA network for Region 5. Its location in the transition zone between cismontane and desert communities in southern California make it an interesting physical and biological natural resource area. It is part of the pinyon-juniper woodland vegetation type typically found and widely distributed in the Lockwood Valley region; however, a third species, dwarf oak, occurs with high cover and abundance all over the CRNA, and junipers are sparse at higher elevations. Most of the CRNA is a large alluvial fan

formed by ancient streamflow off the adjacent Mt. Pinos region mountains, and is occupied by a variety of physical habitats: cushion plant lower montane flats, a gently sloping mesa surface at higher elevations, steeper slopes at the edge of the mesa, narrow and steep rocky canyons, shallow washes, creeks, alluvial terraces, and a wetland spring and meadow area. These habitats are occupied by a floral assemblage composed of many desert transitional species, often occurring outside their typical ranges. The San Emigdio Mesa CRNA is also part of the Chumash Wilderness Area, and has a high cultural resource value potential, as indicated by its physiography and proximity to nearby archaeological sites. All these factors contribute to its high natural resource values; the unique physical and biological habitats offer many opportunities for future research. It is highly recommended that this area should be preserved as an RNA for future conservation.

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APPENDIX A

SOIL MAPPING UNIT CHARACTERISTICS, SAN EMIGDIO MESA

Source: O'Hare and Hallock (1987)

ELEVATION: 2500 to 6200 feet | ANNUAL PRECIPITATION: 8 to 14 inches

SOIL MAP UNIT COMPONENTS	Los Robles	Trigo	Orthents
PROPORTION	30 percent	25 percent	25 percent
LANDSCAPE POSITION	Mountainsides	Mountainsides, north and west aspects	Mountainsides, south & east aspects
SLOPE	30 to 60 percent	30 to 60 percent	30 to 60 percent
VEGETATION SERIES	Annual bromegrass or scrub oak	Annual bromegrass or lupine	Annual bromegrass or California buckwheat

SOIL PROFILE DESCRIPTION

Surface Layer	0 to 4 inches: light yellowish brown sandy loam: moderate subangular blocky structure: soft: 10 percent pebbles: pH 8.0	0 to 10 inches: light yellowish brown gravelly sandy loam: weak subangular blocky structure: soft: 20 percent pebbles: pH 8.0	0 to 4 inches: light yellowish brown sandy loam: weak subangular blocky structure: soft: 10 percent pebbles: pH 8.0
Subsoil	4 to 21 inches: light yellowish brown loam: strong subangular blocky structure: slightly hard: pH 8.0	10 to 17 inches: very pale brown gravelly sandy loam: single grain: soft: 15 percent pebbles and 2 percent pebbles and 2 percent cobbles: pH 8.0	4 to 12 inches: very pale brown sandy loam: weak subangular blocky structure: soft: 25 percent pebbles: pH 8.0
Substratum	21 inches: weathered conglomerate	17 inches: soft conglomerate and sandstone	12 inches: soft weathered sandstone and conglomerate

INCLUDED AREAS: Included in this unit are areas of Fluvents family (38), Modesto family (46), and Ramona family (45). Included areas make up about 20 percent of map unit area.

SOIL PROPERTIES AND MANAGEMENT INTERPRETATIONS

SOIL MAP UNIT COMPONENTS	Los Robles	Trigo	Orthents
EFFECTIVE ROOTING DEPTH	moderately deep	shallow	very shallow
AVAILABLE WATER CAPACITY	moderate	very low to low	very low to low
WATER RETENTION CLASS	1	2	2
HYDROLOGIC SOIL GROUP	C	D	D
PERMEABILITY	moderately rapid	rapid	rapid
MAXIMUM EROSION HAZARD	high	high	high
EROSION FACTOR K	0.28	0.37	0.37
DRAINAGE CLASS	well drained	excessive drained	well drained
SOIL MANAGEABILITY CLASS	3E	3Edx	3Edx
SOIL MANAGEABILITY GROUP	III	III	III
TYPE CONVERSION CLASS	2	3	3
TOTAL PRODUCTION (LBS/AC)	2400	1000	1400
FOREST SURVEY SITE CLASS	None	None	None

REMARKS: This map unit is mostly stable with a few dry ravel slides. Some areas have up to 10 percent surface rock fragments. The bedrock is fractured at 4 to 15 inch intervals with few fine and many medium roots within the cracks.

ELEVATION: 4700 to 8100 feet | ANNUAL PRECIPITATION: 14 to 20 inches

SOIL MAP UNIT COMPONENTS	Morical	Supan	Green Bluff
APPROXIMATE PROPORTION	40 percent	20 percent	20 percent
LANDSCAPE POSITION	Mountain slopes, terraces, or alluvial fans	Mountain slopes, terraces, or alluvial fans	Mountain slopes, or hillslopes
SLOPE	10 to 60 percent	10 to 60 percent	10 to 60 percent
VEGETATION SERIES	Pinyon pine, scrub oak, sagebrush, or Jeffrey pine	Sagebrush or annual bromegrass	Sagebrush or pinyon pine

SOIL PROFILE DESCRIPTION

Surface Layer	0 to 2 inches; dark brown loam; weak granular structure; slightly hard; 3 percent pebbles; pH 7.0	0 to 7 inches; dark grayish brown gravelly loam; weak subangular blocky structure; slightly hard; 20 percent pebbles and 5 percent cobbles; pH 7.2	0 to 6 inches; very dark grayish brown sandy loam; weak subangular blocky structure; slightly hard; 5 percent pebbles; pH 7.4
Subsoil	2 to 28 inches; yellowish brown sandy clay loam; moderate subangular blocky structure; slightly hard; 10 percent pebbles; pH 7.0	7 to 32 inches; dark grayish brown gravelly clay loam; moderate subangular blocky structure; slightly hard; 20 percent pebbles and 5 percent cobbles; pH 7.1	6 to 18 inches; yellowish brown sandy loam; moderate subangular blocky structure; slightly hard; 5 percent gravels; pH 8.0
Substratum	28 to 60 inches; strong brown gravelly sandy loam; massive; slightly hard; 12 percent pebbles and 5 percent cobbles; pH 6.0	32 to 60 inches; dark brown gravelly loam; moderate subangular blocky structure; hard; 20 percent gravels and 10 percent cobbles; pH 7.2	18 to 28 inches; pale brown sandy loam; massive; slightly hard; 5 percent pebbles and 2 percent cobbles; pH 8.0 28 inches; weathered sandstone

INCLUDED AREAS: Included in this unit are areas of Los Gatos family (20), Millerton family (25), soils similar to Morical family (35), and soils similar to Supan family (35). Included areas make up about 20 percent of map unit area.

MAP UNIT | 35 |

A-3

SOIL PROPERTIES AND MANAGEMENT INTERPRETATIONS

SOIL MAP UNIT COMPONENTS	Morical	Supan	Green Bluff
EFFECTIVE ROOTING DEPTH	very deep	very deep	moderately deep
AVAILABLE WATER CAPACITY	moderate to high	moderate	moderate
WATER RETENTION CLASS	1	1	1
HYDROLOGIC SOIL GROUP	B	B	B
PERMEABILITY	moderate	moderate	rapid
MAXIMUM EROSION HAZARD	high	high	high
EROSION FACTOR K	0.32	0.28	0.24
DRAINAGE CLASS	well drained	well drained	well drained
SOIL MANAGEABILITY CLASS	3E	3E	3E
SOIL MANAGEABILITY GROUP	III	III	III
TYPE CONVERSION CLASS	2	2	2
TOTAL PRODUCTION (LBAS/AC)	2200	2600	1500
FOREST SURVEY SITE CLASS	6	7	7

REMARKS: This map unit is mostly stable with a few dry ravel slides and rock slides. Some areas have up to 10 percent surface rock fragments. The bedrock is fractured at 1 to 4 inch intervals with no roots within the cracks.

MAP UNIT | 35 |

ELEVATION: 3500 to 4800 feet | ANNUAL PRECIPITATION: 12 to 16 inches

SOIL MAP UNIT COMPONENTS	Orthents	Fluvents
APPROXIMATE PROPORTION	60 percent	30 percent
LANDSCAPE POSITION	stream terraces	stream terraces
SLOPE	0 to 15 percent	0 to 15 percent
VEGETATION SERIES	Annual bromegrass or pinyon pine	Sagebrush or annual bromegrass

SOIL PROFILE DESCRIPTION

Surface Layer	0 to 5 inches; light yellowish brown coarse sandy loam; weak platy structure; soft; 8 percent pebbles; pH 8.0	0 to 14 inches; pale brown sandy loam; weak granular structure; soft; 2 percent pebbles; pH 8.0
Subsoil	5 to 60 inches; very pale brown sandy loam; massive; slightly hard; 4 percent pebbles; pH 8.0	14 to 40 inches; pale brown sandy loam; massive; slightly hard; 2 percent pebbles; pH 8.0
Substratum	5 to 60 inches; very pale brown sandy loam; massive; slightly hard; 4 percent pebbles; pH 8.0	14 to 60 inches; pale brown sandy loam; massive; slightly hard; 2 percent pebbles; pH 8.0

INCLUDED AREAS: Included in this unit are areas of Modesto family (46), and riverwash (50). Included areas make up about 10 percent of map unit area.

SOIL PROPERTIES AND MANAGEMENT INTERPRETATIONS

SOIL MAP UNIT COMPONENTS	Orthents	Fluvents
EFFECTIVE ROOTING DEPTH	very deep	very deep
AVAILABLE WATER CAPACITY	moderate	moderate
WATER RETENTION CLASS	2	2
HYDROLOGIC SOIL GROUP	B	B
PERMEABILITY	rapid	rapid
MAXIMUM EROSION HAZARD	moderate	moderate
EROSION FACTOR K	0.20	0.24
DRAINAGE CLASS	well drained	well drained
SOIL MANAGEABILITY		
CLASS	2e	2e
GROUP	II	II
TYPE CONVERSION CLASS	2	2
TOTAL PRODUCTION (LBS/AC)	1750	1800
FOREST SURVEY SITE CLASS	7	7

REMARKS: This map unit is subject to gully erosion. Some areas have up to 50 percent surface rock fragments. There is no bedrock within 60 inches. This map unit is subject to flash floods from concentrated runoff on adjacent steeper mountain slopes.

APPENDIX B

HOLLAND VEGETATION TYPES FOUND AT SAN EMIGDIO MESA

Source: Holland (1986)

ELEMENT NAME: Mojavean Piñon Woodland ELEMENT CODE: 72210

DESCRITION: An open woodland dominated by Pinus monophylla, with an open shrubby understory of species commonly found in adjacent nonforested stands. Understories are more diverse in shrubs than most Piñon-Juniper types, and may actually exceed tree cover. Dominant shrubs include Artemisia tridentata and Cercocarpus ledifolius.

SITE FACTORS: Desert mountain ranges, usually between about 4000 ft and 8000 ft. Intergrades at higher elevations with Desert Mountain White Fir Forest (85330) or Bristlecone Pine Forest (86400); at lower elevations with Mojavean Juniper Woodland and Scrub (72220). Better developed on steeper, every slopes.

CHARACTERISTIC SPECIES: Artemisia tridentata, Cercocarpus ledifolius, Coleogyne ramosissima, Cowania mexicana stansburiana, Ephedra nevadensis, Eriogonum fasciculatum polifolium, Fallugia paradoxa, Pinus monophylla, Purshia glandulosa, Quercus turbinella, Yucca brevifolia, Salvia pachyphylla, Lupinus excubitus, Eriogonum wrightii, Coreopsis bigelovii, Gilia latiflora, [Brownus tectorum].

DISTRIBUTION: At appropriate elevations on most Mojave Desert mountain ranges, as well as the drier headwaters of South Fork Kern River.

SOURCES: 1, 13, 21, 48, 150

ELEMENT NAME: Mojavean Juniper Woodland and Scrub

ELEMENT CODE: 72220

DESCRIPTION: An extremely open woodland dominated by Juniperus californicus, with understory of typical Mojave Mixed Scrub and Steppe species (34200). Understories are more diverse than in most Piñon-Juniper types.

SITE FACTORS: Better developed on gentle slopes or alluvium, usually at slightly lower elevations than the Mojavean Piñon Woodland (72210), Jeffrey Pine Forest (85100), or Semidesert Chaparral (37400). Also intergrades with Joshua Tree Woodland (73000) or Mojave Creosote Bush Scrub (34100) on drier soils at lower elevations. 5000-8000 ft in the north, 4000-6000 ft in the south.

CHARACTERISTIC SPECIES: Cercocarpus intricatus, Coleogyne ramosissima, Cowania mexicana stansburiana, Fallugia paradoxa, Juniperus californicus, Quercus turbinella, Thamnosma montana, Yucca brevifolia

DISTRIBUTION: Southern Sierra Nevada and Tehachapi mountains and along the desert slopes of the Transverse and Peninsular ranges; also at appropriate elevations around the mountains in the Mojave Desert.

SOURCES: 1, 13, 21, 48, 129

APPENDIX C

PHOTOGRAPHS TAKEN AT SAN EMIGDIO MESA

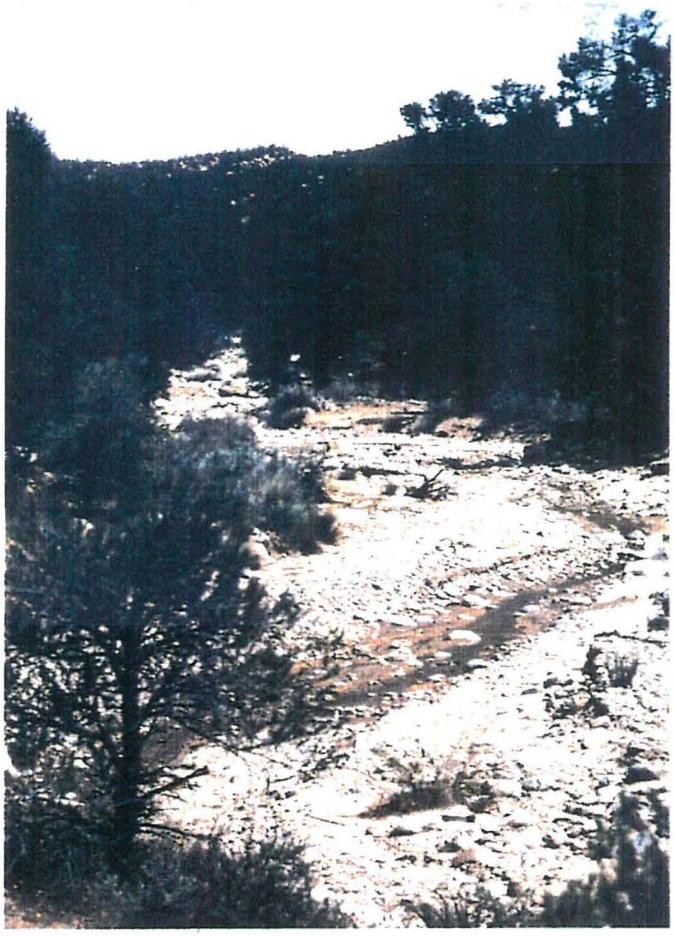

Photo 1. View of Apache Canyon at the Base of San Emigdio Mesa, Overstory of Pinyon Pines (*Pinus monophylla*), Location A.

Photo 2. Wetland Meadow Vegetation at Cienega Spring at the Base of San Emigdio Mesa, Location D.

Photo 3. Pinyon-Oak Woodland With An Understory of Basin Sagebrush (*Artemisia tridentata*), on an Alluvial Terrace at the Base of Slopes Leading to the Top of San Emigdio Mesa, Location B.

Photo 4. Pinyon-Oak-Juniper Woodland With An Understory of Basin Sagebrush (*Artemisia tridentata*) and Annual Species, Dry Wash Leading to the Top of San Emigdio Mesa, Location E.

Photo 5. Pinyon-Oak-Juniper Woodland With An Understory of Shrubs and Low-Growing Perennials, in a Dry, Wide, Shallow, Upper Wash on San Emigdio Mesa, Between Locations H and I.

Photo 6. Mature Pinyon Pines (*Pinus monophylla*) With Dwarf Oaks (*Quercus turbinella* ssp. *californica*) and Varied Understory Plants, Top of San Emigdio Mesa, Location K.

Photo 7. Lemmon's Xerasid/Syntrichopappus (*Syntrichopappus lemmonii*), CNPS List: 4, State/Federal Status: none.

Photo 8. California Juniper (*Juniperus californica*), an Occasional Component of the Pinyon-Juniper Woodland Target Vegetation Type in the San Emigdio Mesa CRNA, Location H.

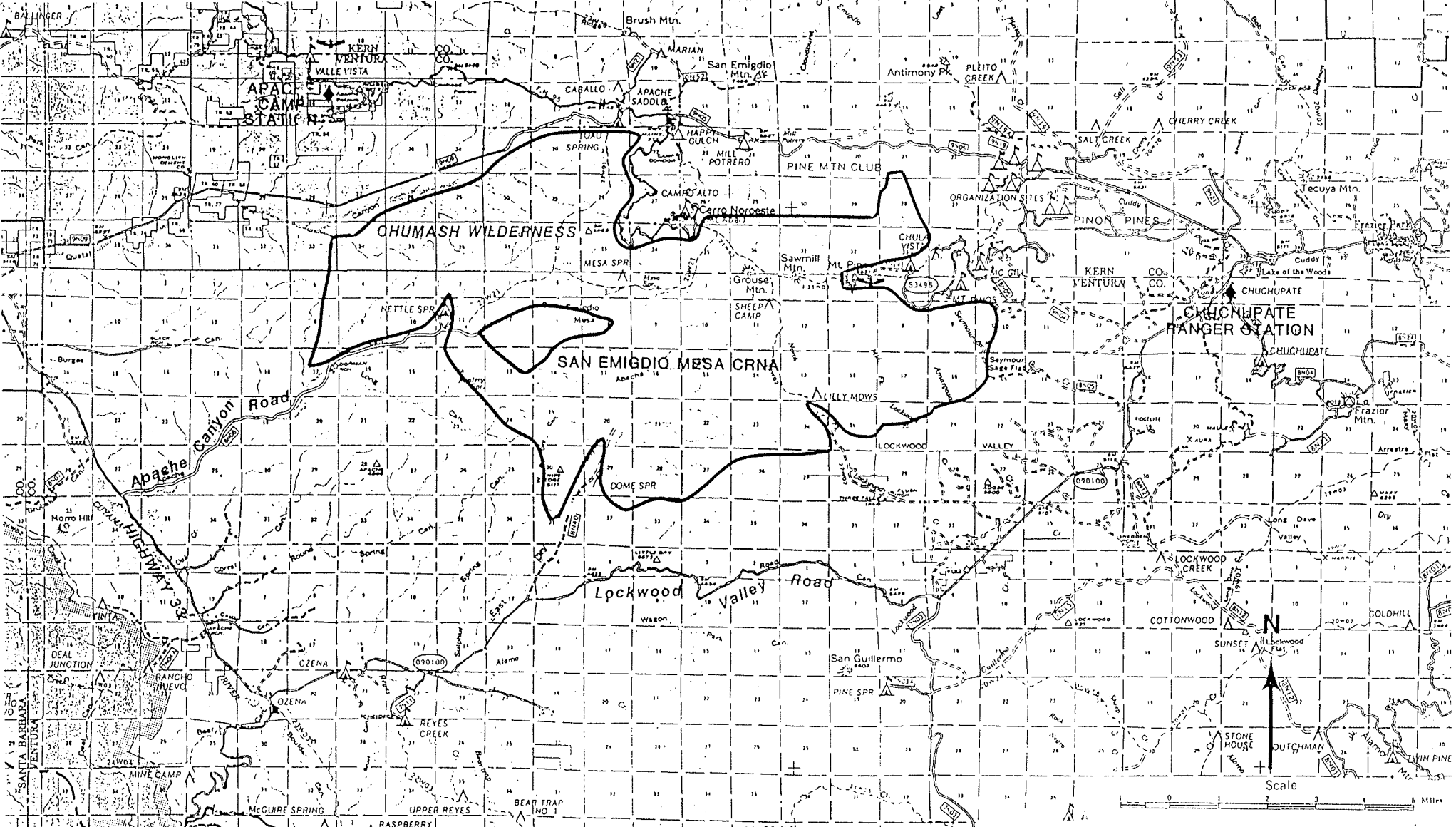

FIGURE 1. REGIONAL LOCATION OF SAN EMIGDIO MESA CRNA

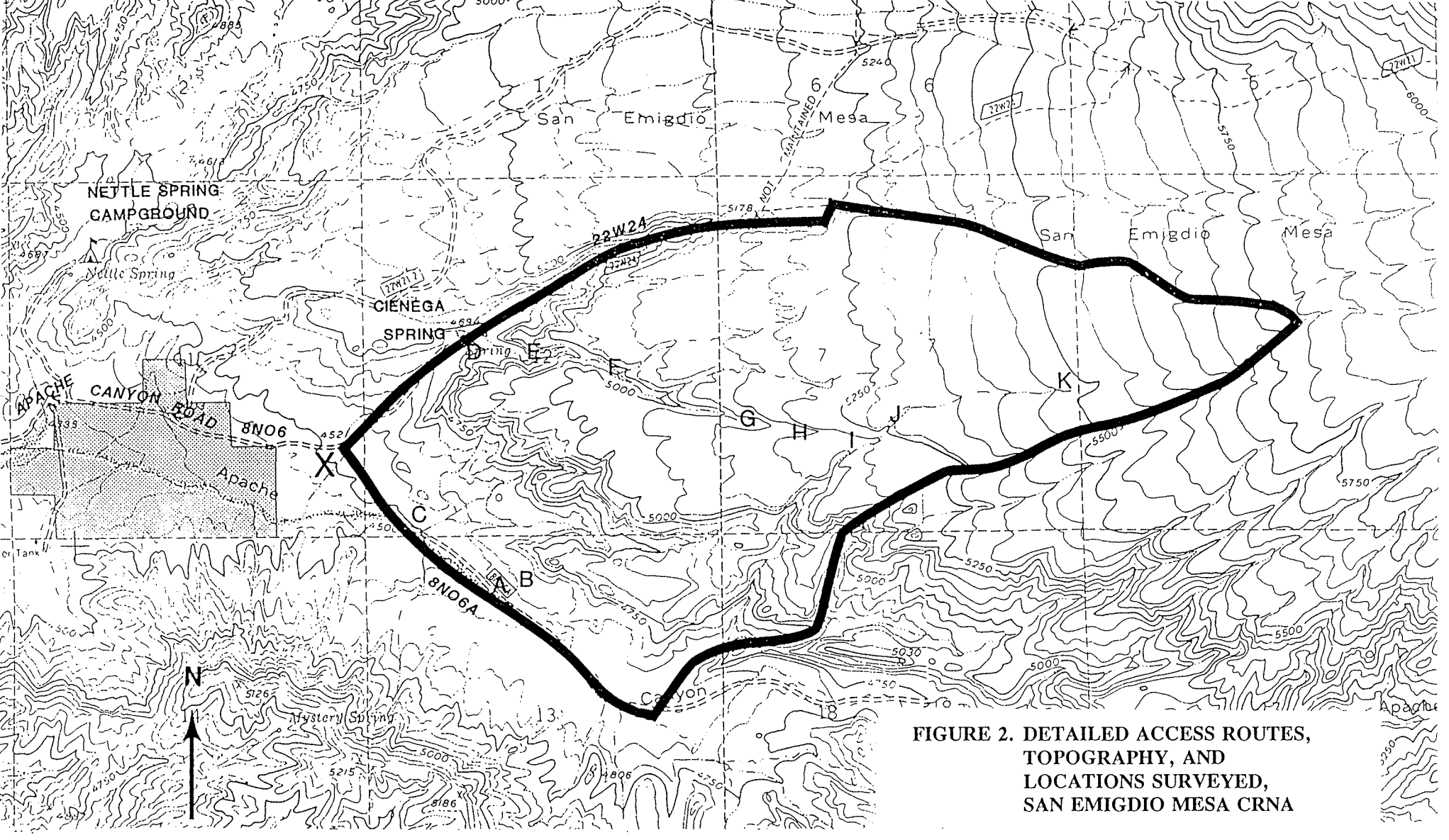

FIGURE 2. DETAILED ACCESS ROUTES, TOPOGRAPHY, AND LOCATIONS SURVEYED, SAN EMIGDIO MESA CRNA

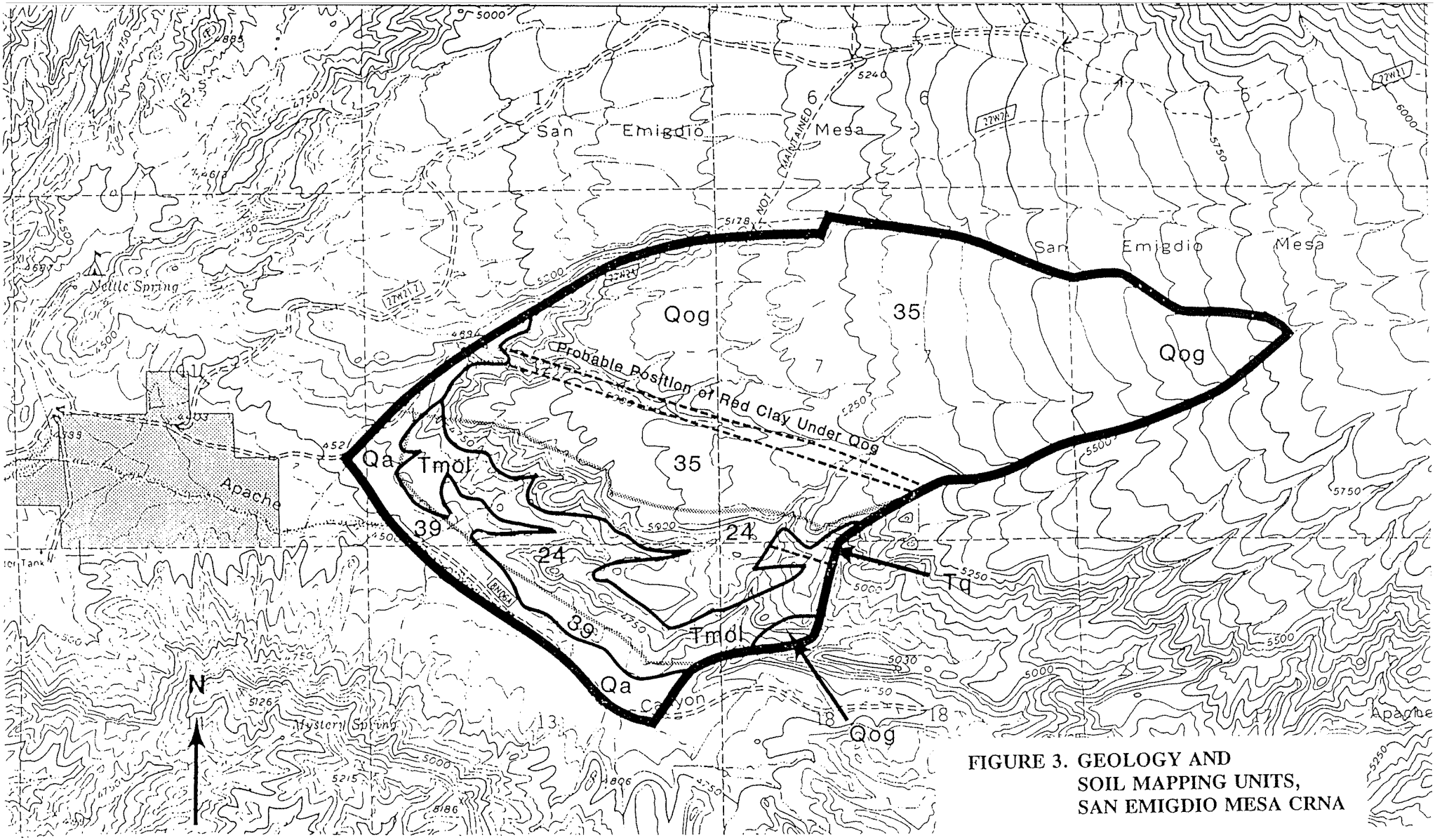

FIGURE 3. GEOLOGY AND SOIL MAPPING UNITS, SAN EMIGDIO MESA CRNA

LEGEND

Soil Mapping Unit Boundary
Map Unit Nos. 24, 35, 39

Actual or Inferred Geological Boundary
Geological Units Qa, Qog, Tmol, Tq

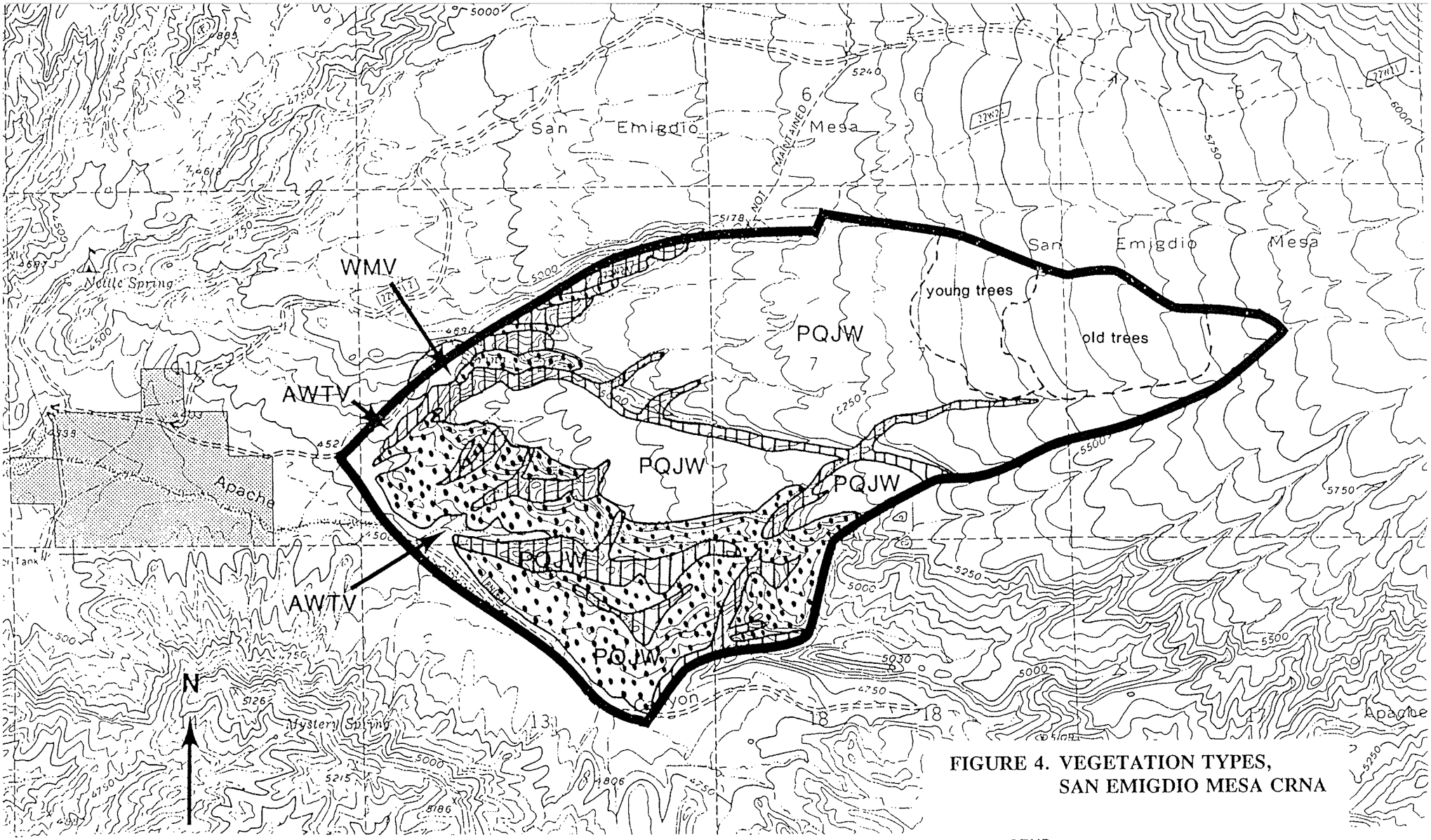

FIGURE 4. VEGETATION TYPES, SAN EMIGDIO MESA CRNA

LEGEND

AWTV	Alluvial Wash and Terrace Vegetation
PQJW	Pinyon–Oak–Juniper Woodland
	high density
	moderate density
	low density with upper mesa flats vegetation
WMV	Wetland Meadow Vegetation

Table 1. Locations Surveyed with Dates, San Emigdio Mesa CRNA
(pg 1 of 2)

Location Date	Physical Characteristics	Overstory and Understory Species Ranked by Dominance
A 5/9/92	Banks, slopes of wash, water flow Boulders, fine soil Elevation 4500-4600 ft Gentle slope 3-5° Direction of stream flow WNW, 285° Cow pies seen fairly commonly	*Pinus monophylla; Chrysothamnus nauseosus;* *Haplopappus linearifolius; Gutierrezia bracteata;* *Quercus turbinella; Artemisia tridentata;* *Arctostaphylos glauca; Lupinus excubitus/formosus;* *Gilia ?interior; Camissonia campestris; Phacelia distans*
B 5/9/92	First terrace of wash at A Fine silty alluvial wash soil Elevation 4500-4600 ft Gentle slope 2-3° Exposure west-facing, 270° Cow pies seen fairly commonly	*Pinus monophylla; Quercus turbinella;* *Artemisia tridentata; Haplopappus linearifolius;* *Lupinus excubitus/formosus; Sitanion jubatum;* *Penstemon centranthifolius; Bromus tectorum*
C 5/9/92	Flats off the road Fine soil Elevation 4530 ft Gentle slope 2° Exposure south-facing 180° Cow pies less common than at A and B	*Pinus monophylla; Juniperus californica;* *Quercus turbinella; Artemisia tridentata;* *Collinsia bartsiaefolia; Gilia ?interior;* *Bromus tectorum*
D 5/9/92	Wetland meadow, Cienega Spring Fine silty soil, boggy area Elevation 4700 ft Gentle slope 5° Exposure southwest-facing 225° Protected enclosure; cattle grazing evident outside fence	*Rhamnus californica; Eriodictyon crassifolium;* *Urtica holosericea; Carex sp.;* *Scirpus sp.; Juncus sp.;* *Eleocharis sp.; Veronica americana;* *Mimulus guttatus; Ranunculus cymbalaria*
E 5/9/92	Dry wide wash/shallow canyon Fine soil Elevation 4700-4800+ ft Slope 7-10° Wash runs west, exposure 270° Cow pies common	*Pinus monophylla; Juniperus californica;* *Rhamnus californica; Artemisia tridentata;* *Quercus turbinella; Eriogonum spp.;* *Phacelia distans; Layia glandulosa;* *Phacelia egena*
F 5/25/92	Dry wash/shallow canyon Fine to coarse and gravelly soil Elevation 4900-4950 ft Slope 5° Wash runs northwest, exposure 295° Grazing activity decreasing	*Pinus monophylla; Quercus turbinella;* *Juniperus californica; Lupinus excubitus/formosus;* *Lotus scoparius; Sitanion jubatum; Eriogonum wrightii;* *Phacelia douglasii; Mimulus johnstonii;* *Phacelia curvipes; Ephedra californica;* *Syntrichopappus lemmonii*
G 5/25/92	Rocky canyon/wash Coarse gravelly or rocky soil Elevation 5100 ft Slope 5° Exposure northwest, 295° No more grazing activity	*Pinus monophylla; Quercus turbinella:* *Eriogonum fasciculatum polifolium;* *Melica imperfecta; Lotus scoparius;* same species as at location F
H 5/25/92	Widened open shallower wash Fine to coarse soil Elevation 5150 ft Slope 2-3° Exposure WSW, about 250° Grazing absent	*Pinus monophylla; Juniperus californica;* *Quercus turbinella; Camissonia strigulosa;* *Eriastrum sparsiflorum; Linanthus aureus;* *Lupinus excubitus/formosus; Eriophyllum pringleii;* *Lotus scoparius; Orobanche fasciculata* on *Eriogonum wrightii*

Table 1. Locations Surveyed with Dates, San Emigdio Mesa CRNA
(pg 2 of 2)

Location Date	Physical Characteristics	Overstory and Understory Species Ranked by Dominance
I	Upper wash flats on mesa	*Quercus turbinella; Juniperus californica;*
5/25/92	Rocky soil with boulders on top	*Pinus monophylla; Haplopappus linearifolius;*
	Elevation 5200 ft	*Artemisia tridentata; Lotus scoparius;*
	Slope very gentle, 1°	*Lupinus excubitus/formosus; Astragalus purshii;*
	Southwest-facing slope, exposure 225°	*Eriogonum kennedyi; Pedicularis* sp.;
	Grazing absent	*Calochortus kennedyi*
J	Narrow boulder wash	*Pinus monophylla; Quercus turbinella;*
5/25/92	Gravelly coarse soil	*Juniperus californica; Lupinus excubitus/formosus;*
	Elevation 5250-5300 ft	*Psoralea californica; Allium fimbriatum;*
	Steeper slope, about 10°	*Penstemon laetus; Phacelia curvipes;*
	Wash runs SW, exposure 200-260°	*Melica imperfecta*
	Grazing absent	
K	Upper flats/wash slopes on mesa	*Quercus turbinella; Pinus monophylla;*
5/25/92	Coarse to gravelly soil	*Lupinus excubitus/formosus; Artemisia tridentata;*
	Elevation 5460 ft	*Eriogonum kennedyi; Eriogonum fasciculatum polifolium;*
	Slope about 10°	*Eriogonum wrightii; Haplopappus linearifolius;*
	Exposure 150°	*Sitanion jubatum; Lotus scoparius; Ephedra californica;*
	No grazing	*Zigadenus brevibracteatus*

Note: Species nomenclature follows Munz and Keck (1968); Munz (1974); and Smith (1976).
Locations are all mapped in Figure 2.

Table 2. Plant Species List, San Emigdio Mesa CRNA
Compiled by Anuja Parikh from Surveys 5/92
(page 1 of 3)

Family	Species Scientific Name	Location *	Abundance **	Voucher# ***
Agavaceae	*Yucca ?schidigera*	E,J	O	
Amaryllidaceae	*Allium fimbriatum* var. *fimbriatum*	J	O	SEM 62
Amaryllidaceae	*Muilla maritima*	A,B	R	SEM 12
Apiaceae	*Lomatium mohavense*	D,E	R	SEM 78
Asclepiadaceae	*Asclepias ?californica*	E	R	
Asteraceae	*Artemisia dracunculus*	D	S	
Asteraceae	*Artemisia tridentata*	all	O	
Asteraceae	*Chaenactis* sp.	E	O	SEM 44
Asteraceae	*Chrysothamnus nauseosus* ssp. *hololeucus*	A	C	
Asteraceae	*Coreopsis bigelovii*	E	S	SEM 33
Asteraceae	*Eriophyllum confertifolium*	E,F,G	O,C	SEM 56
Asteraceae	*Eriophyllum pringlei*	B,F,H	O	SEM 24
Asteraceae	*Gnaphalium ?palustre*	D	S	
Asteraceae	*Gutierrezia bracteata*	A	O	
Asteraceae	*Haplopappus linearifolius*	all	O	
Asteraceae	*Lasthenia chrysostoma*	C	O	SEM 32
Asteraceae	*Layia glandulosa* ssp. *lutea*	B,E	O,S	SEM 27,47
Asteraceae	*Microseris linearifolia*	C,E	S	
Asteraceae	*Sonchus asper*	D	R	
Asteraceae	*Stylocline filaginea*	F	R	
Asteraceae	*Syntrichopappus lemmonii*	E,F	R	SEM 79,80
Boraginaceae	*Cryptantha circumcissa* (low, pungent lvs)	A	O	SEM 13
Boraginaceae	*Cryptantha* sp. (shorter, condensed flr)	E	S	SEM 45
Boraginaceae	*Cryptantha* sp. (tall, slender)	A,B,E	S	SEM 16
Boraginaceae	*Pectocarya penicillata*	C	S	SEM 30
Boraginaceae	*Pectocarya setosa*	A,B	S	SEM 15
Brassicaceae	*Arabis pulchra*	B	R	SEM 43
Brassicaceae	*Erysimum capitatum*	B	O	SEM 21
Caprifoliaceae	*Lonicera johnstonii/Symphoricarpos parishii*	C	S	
Caryophyllaceae	*Arenaria douglasii*	C,E	S	SEM 31
Chenopodiaceae	*Chenopodium californicum*	D	R	
Cupressaceae	*Juniperus californica*	all	S	
Cyperaceae	*Carex ?praegracilis*	D	A	SEM 38
Cyperaceae	*Eleocharis parishii*	D	O	SEM 40
Cyperaceae	*Scirpus pungens*	D	O	SEM 39
Ephedraceae	*Ephedra californica*	B,E,F,K	O	
Ericaceae	*Arctostaphylos glauca*	A,D	S,R	
Fabaceae	*Astragalus purshii* var. *tinctus*	I,K	C,O	SEM 63
Fabaceae	*Lotus humistratus*	I,K	C	SEM 64
Fabaceae	*Lotus oblongifolius*	D	S	SEM 58
Fabaceae	*Lotus procumbens*	A	S	SEM 6

Table 2. Plant Species List, San Emigdio Mesa CRNA
Compiled by Anuja Parikh from Surveys 5/92
(page 2 of 3)

Family	Species Scientific Name	Location *	Abundance **	Voucher# ***
Fabaceae	*Lotus scoparius*	F-K	O	
Fabaceae	*Lotus strigosus* var. *hirtellus*	A,F	R,S	SEM 70
Fabaceae	*Lotus subpinnatus*	E	S	SEM 34
Fabaceae	*Lupinus concinnus*	A,E	S	SEM 9
Fabaceae	*Lupinus excubitus* var. *austromontanus/formosus*	all	C	SEM 1
Fabaceae	*Lupinus ruber*	B,I	S	SEM 22,65
Fabaceae	*Psoralea californica*	J	C	SEM 60
Fagaceae	*Quercus turbinella* ssp. *californica*	all	A,C,S	
Hydrophyllaceae	*Emmenanthe penduliflora*	E,F	S	SEM 71
Hydrophyllaceae	*Eriodictyon crassifolium* var. *denudatum*	D	O	SEM 57
Hydrophyllaceae	*Phacelia cicutaria*	F	R	SEM 67
Hydrophyllaceae	*Phacelia curvipes*	F-J	O,S	SEM 75
Hydrophyllaceae	*Phacelia distans*	A,B,E,F	O	SEM 11,46,76
Hydrophyllaceae	*Phacelia douglasii*	A,B,E,F	O	SEM 10
Hydrophyllaceae	*Phacelia egena*	E,F	O	SEM 54
Hydrophyllaceae	*Phacelia fremontii*	A,B	R	SEM 8
Juncaceae	*Juncus mexicanus*	D	O	SEM 41
Lamiaceae	*Salvia columbariae*	A-E	S	SEM 17
Lamiaceae	*Stachys* sp.	D	S	
Liliaceae	*Calochortus kennedyi*	I,K	S	SEM 66
Liliaceae	*Zigadenus brevibracteatus*	K	R	SEM 50
Loasaceae	*Mentzelia pectinata*	B	O	SEM 42
Onagraceae	*Camissonia campestris*	A	O	SEM 7
Onagraceae	*Camissonia* sp. (*?micrantha*)	F	R	SEM 81
Onagraceae	*Camissonia ?strigulosa*	H	R	SEM 49
Orobanchaceae	*Orobanche fasciculata* (on *Eriogonum wrightii*)	H,K	R	SEM 59
Pinaceae	*Pinus monophylla*	all	A,C,S	
Poaceae	*Bromus rubens*	B	O	
Poaceae	*Bromus tectorum*	B	O	SEM 19
Poaceae	*Elymus ?condensatus*	D	S	
Poaceae	*Melica imperfecta*	G,J	S	
Poaceae	*Poa scabrella*	B,E	S	SEM 20
Poaceae	*Sitanion jubatum*	B,F,K	O	SEM 18
Polemoniaceae	*Eriastrum sparsiflorum*	H	R	SEM 79
Polemoniaceae	*Gilia ?interior* (lavender, large flr)	A	C	SEM 5
Polemoniaceae	*Gilia* sp. (small, dark pink-magenta)	E,F,G	S	SEM 77
Polemoniaceae	*Linanthus aureus*	A,H,I	O,C	SEM 4
Polemoniaceae	*Linanthus dichotomus*	F	R	SEM 82
Polemoniaceae	*Microsteris gracilis*	E,F	R	SEM 74
Polygonaceae	*Chorizanthe thurberi*	A,B	S	SEM 23
Polygonaceae	*Eriogonum fasciculatum* ssp. *polifolium*	C,E,G,K	O	

Table 2. Plant Species List, San Emigdio Mesa CRNA
Compiled by Anuja Parikh from Surveys 5/92
(page 3 of 3)

Family	Species Scientific Name	Location *	Abundance **	Voucher# ***
Polygonaceae	*Eriogonum kennedyi*	I,K	C	SEM 53
Polygonaceae	*Eriogonum nudum* var. *pubiflorum*	E,F	O,C	SEM 55
Polygonaceae	*Eriogonum wrightii* ssp. *subscaposum*	E-K	O,C	SEM 51,52
Polygonaceae	*Mucronea perfoliata*	B	S	SEM 28
Portulacaceae	*Calyptridium monandrum*	A	O	SEM 14
Portulacaceae	*Claytonia perfoliata*	B,C,E,F	O	
Ranunculaceae	*Ranunculus cymbalaria*	D	S	SEM 36
Rhamnaceae	*Rhamnus californica*	D,E	O,C	
Rosaceae	*Cercocarpus betuloides*	E	R	
Rubiaceae	*Galium andrewsii*	B	O	SEM 26
Rubiaceae	*Galium aparine*	E,F	S	SEM 72
Salicaceae	*Salix laevigata*	D	R	
Scrophulariaceae	*Castilleja jepsonii*	A	S	SEM 2
Scrophulariaceae	*Collinsia bartsiaefolia* var. *davidsonii*	C	C	SEM 29
Scrophulariaceae	*Collinsia callosa*	E,F,G	R,S	SEM 73
Scrophulariaceae	*Mimulus guttatus*	D	S	
Scrophulariaceae	*Mimulus johnstonii*	B,G-K	O,C	SEM 25,68
Scrophulariaceae	*Pedicularis* sp.	I,K	O	
Scrophulariaceae	*Penstemon centranthifolius*	B	O	SEM 48
Scrophulariaceae	*Penstemon grinnellii* ssp. *scrophularioides*	A	R	SEM 3
Scrophulariaceae	*Penstemon laetus*	J	S	SEM 61
Scrophulariaceae	*Veronica americana*	D	O	SEM 37
Urticaceae	*Urtica holosericea*	D	O	
Violaceae	*Viola purpurea*	E,F	S	SEM 35

* Location: see Table 1 and Figure 2.

** Abundance:
A abundant;
C common;
O occasional;
S scattered;
R rare.

*** Voucher#: Plant collections deposited at the Herbarium, Santa Barbara Botanic Garden. Species identified with the help of Clif Smith. Species ID tentative for some specimens.

Species Nomenclature: Munz and Keck (1968); Munz (1974); Smith (1976).

Table 3. Vegetation Sampling Results, San Emigdio Mesa CRNA

Maximum Dbh of *Pinus monophylla* in centimeters	76.20
Minimum Dbh of *Pinus monophylla* in centimeters	3.00
Mean Dbh of *Pinus monophylla* in centimeters	17.87
Maximum Basal Area of *Pinus monophylla* in square meters	0.4560
Minimum Basal Area of *Pinus monophylla* in square meters	0.0007
Mean Basal Area of *Pinus monophylla* in square meters	0.0412
Total Density of all trees per hectare	267.57
Total Density of *Juniperus californica* per hectare	~~197.49~~ 42.37
Total Density of *Pinus monophylla* per hectare	~~284.88~~ 225.21
Relative Density of *Juniperus californica* ~~per hectare~~	~~42.37~~ .16
Relative Density of *Pinus monophylla* ~~per hectare~~	~~225.21~~ .84
Basal Cover/dominance of *Pinus monophylla* in sq m per ha	9.2683
Mean Height of all trees in meters	5.55
Maximum Height of *Juniperus californica* in meters	5.00
Minimum Height of *Juniperus californica* in meters	1.80
Mean Height of *Juniperus californica* in meters	3.09
Maximum Height of *Pinus monophylla* in meters	20.00
Minimum Height of *Pinus monophylla* in meters	1.80
Mean Height of *Pinus monophylla* in meters	6.01
Total Seedling Numbers in sampled plots: *	
Juniperus californica	0
Pinus monophylla	46
Quercus turbinella	103
Total Sapling/Shrub Numbers in sampled plots: *	
Juniperus californica	3
Pinus monophylla	32
Quercus turbinella	95

* Seedlings, Saplings, and Trees were defined by height:

Seedlings < 0.25 m tall
Saplings > 0.25 m tall, < 1.5 m tall
Trees > 1.5 m tall